

MENTAL HEALTH LEVELS AMONG CHINESE COLLEGE BRIDGE ATHLETES

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Abstract

Bridge is an intellectual sport that helps to develop the ability to analyze logic and teamwork, and is well developed in Chinese colleges. This study aimed to explore the mental health level and influencing factors of Chinese college bridge athletes. This study was conducted on athletes who participated in the 2023 Chinese College Bridge Championships (N=210). The analysis showed that the lowest SCL-90 score of the athletes was 90, the highest score was 277, and the mean score was 125.76 ± 34.91 . There were significant differences in the scores of Obsessive-Compulsive Disorder (OCD) ($p < 0.01$), Depression ($p < 0.05$), and Phobic Anxiety ($p < 0.05$) factors of the athletes of different genders, and the findings showed males were better than females. Athletes of different ages showed significant differences in OCD factor scores ($p < 0.05$), with higher ages having better mental health. There was a significant difference between athletes with different levels of education in the OCD and Interpersonal Sensitivity factor scores ($p < 0.05$), with no difference between the Bachelor's and Master's groups. However, the PhD group had significantly better mental health. There was a significant difference in the

OCD and Phobic Anxiety factor scores among athletes with different years of training ($p < 0.05$), and the higher the training years, the better the mental health status. There were no significant differences in mental health scores between athletes with different levels of participations and skill levels, however LSD two-by-two comparisons showed that athletes' mental health improved as the number of participations increased. Overall, the older the age, the longer the training time, and the greater the number of participants, the better the mental health of the athletes. In addition, athletes scored higher in the three factors of Obsessive - Compulsive Disorder, Other Factors, and Interpersonal Sensitivity, which need to be attended to by Chinese college bridge practitioners.

Keywords: bridge, mental health, bridge athletes

INTRODUCTION

Bridge is an intellectual sport that helps develop the ability to analyze logic and teamwork, involving knowledge of probability, logic, psychology, and other aspects, hence, as a team sport, it fits well with the spirit of contemporary sports (Rao & Wang, 2021). In the 1920s, with the introduction of Western culture into China at that time, the bridge received the attention of elites from all walks of life. In 1980, the China Bridge Association was established in 1980. In 2004, the bridge branch of China University Sports Federation was established. Bridge is currently an official competition event at the Asian Games and a performance event at the Olympics.

Since the official establishment of the bridge branch of the China University Sports Association in 2004, the sport of bridge has been developing rapidly in colleges and universities. As the highest level of bridge competition in Chinese universities, the China University Bridge Championship has been successfully held 20 times. Statistics show that there are more than 200 colleges and universities in China, which have played a crucial role in promoting the popularity and development of bridges among college students and the spread of bridge culture (Pan, 2018). Data show that in 2017, the Chinese women's team won the Venice Cup women's team championship in the World Bridge Team Championship, with two college student-athletes among the team members; in 2019, the Chinese women's team won the runner-up of the tournament, with three college student-athletes among them, indicating that the development of Chinese college student bridge sport has made a great contribution to the country (Shen, 2022).

However, studies have shown that most students in Chinese colleges and universities receive only technical and tactical learning in the process of training college athletes while neglecting the control and guidance of students' psychology (Cai et al., 2010). Although some scholars pointed out that psychological knowledge is involved in the bridge learning process, it is only superficial or simple

guidance, such as only covering how to stabilize the mind of athletes when facing pressure. Compared to traditional sports that require athletes to have good physical fitness, bridge, as an intellectual sport, places more emphasis on athletes' mental health, and more urgently addresses the issue of athletes' mental health.

METHODOLOGY

Research Design

The purpose of this study was to explore the mental health of Chinese college bridge athletes using a quantitative approach, the *Research Framework* is shown in Figure 1. The main questionnaire used in this study is Symptom Checklist 90 (SCL-90) (Wang, 1984). It is well-established and reliable and has been used extensively by Chinese scholars. Using Cronbach's α coefficient to measure the internal consistency reliability of each dimension (factor), the Cronbach's α coefficient of the scale is 0.951 indicating that the questionnaire has good reliability. The results of the validity analysis showed a KMO value of 0.928, indicating that the structural validity of the questionnaire was good. The demographic information collection questionnaire for athletes is self-designed questionnaire, and includes details such as athlete gender, age, degrees, number of years of bridge training, number of participations in different levels of competition, skill level, etc.

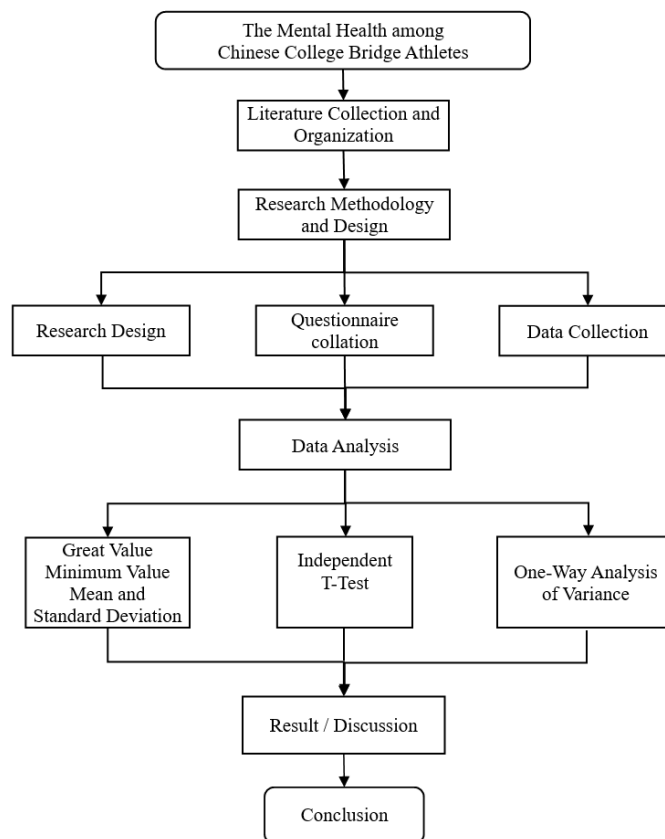


Figure 1: Research Framework

Samples

This study was conducted on athletes who participated in the 2023 Chinese College Bridge Championships (N=210). All survey questionnaires were distributed to athletes. The sample size for this study was determined based on the selection formula of Krejcie and Morgan (1970) on sample size: $s = X^2NP (1-P) / d^2(N-1) + X^2P (1-P)^*$.

*s = required sample size.

X² = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

Procedures

The premise of this study is that the college bridge athletes participating in this study will be able to understand the meaning of the questionnaire questions and choose the corresponding answers honestly and accurately. Given the sensitivity of the local Chinese population to mental health issues, the subject matter of this study is also particularly for college bridge athletes. Therefore, conducting a survey among college bridge athletes will be challenging. To ensure the quality of the survey and to obtain true and accurate data, the following quality control methods were adopted in this study.

The purpose and significance of the survey were sincerely explained at the beginning of the questionnaire, and a careful commitment to academic ethics and confidentiality of the respondents' personal information would ensure that it does not influence the individual respondents, coaches, and training units. Before surveying college bridge athletes, it was important to communicate with the team leaders and coaches asking them to explain the significance of the survey and the promise of confidentiality to the athletes to minimize their psychological barriers.

Data Analysis

- a) The completeness of each questionnaire will be checked and then recovered; after recovery, the authenticity of the questionnaire will be checked, invalid questionnaires will be deleted, and data will be entered.
- b) The scores of mental health symptom self-assessment scale of Chinese college student bridge athletes will be analyzed by means of maximum value, minimum value, mean, and standard deviation.
- c) An independent t-test will be used to analyze the SCL-90 scores of Chinese college bridge athletes.
- d) One-way analysis of variance will be used to analyze the effects of different ages, genders, training years, skill levels, and participated competition levels on mental health.

RESULTS

Information about Respondents

The demographic information on the survey respondents' gender, age, education, years of training, number of previous participation experience, and skill level of Chinese Contract Bridge Association (CCBA) is shown in Table 1:

Table 1: The Information of the respondents (n=210)

Item	Category	Frequency (n)	Percentage (%)
Gender	Male	122	58.1
	Female	88	41.9
Age	18-21	128	61.0
	22-24	72	34.2
	25-27	10	4.8
Degree	Undergraduate	175	83.3
	Master	18	8.6
	Ph.D	17	8.1
Training Years	≤2	120	57.1
	3-6	69	32.9
	≥7	21	10.0
Number of Previous Participations	≤2	81	38.6
	3-6	68	32.4
	≥7	61	29.0
Skill Level of CCBA	None	162	77.1
	Club Master	21	10.0
	R&N&L Master*	27	12.9

* R&N&L Master=Regional Master, National Master and Lifetime Master

Among these 210 athletes, there are 122 males, accounting for 58.1%, and 88 females, accounting for 41.9%. In the age distribution, there are 90 athletes aged 17 to 20, accounting for 42.9%. The number of athletes aged 21 to 24 is the highest, with 110, accounting for 52.3%. There are only 10 athletes aged 25 to 28, accounting for only 4.8% of the total. In the distribution of educational qualifications, the number of undergraduate students are 175, accounting for 83.3%. Most athletes are undergraduate students, while the number of master’s and doctoral students are similar, with 18 and 17 respectively. In terms of training duration, 120 athletes have been training for 2 years or less, accounting for 57.1%. More than half of the athletes have been training for no more than 2 years, 69 athletes have been training for 3 to 6 years, and only 21 athletes have been training for 7 to 13 years.

In terms of the number of participations, there were 81 athletes with 2 or fewer participations, accounting for 38.6% of the total; the number of athletes with 3 to 6 participations and 7 or more participations was about the same, accounting for 32.4% and 29.0% of the total, respectively. Looking at the sports ranks of the Chinese Contract Bridge Association, 162 people did not earn any rank, totaling 77.1% of the total; 21 people earned the rank of Club Master; and a total of 27 people earned ranks in the categories of Regional Master, National Master, and Lifetime Master. Because of the small number of higher ranks, the 3 categories of Regional Masters, National Masters, and Life Masters have been grouped together.

The Basic Description of the Mental Health of Bridge Athletes

The scores of the symptom self-assessment scale of bridge athletes were analyzed by the maximum value, the minimum value, the mean value, and the standard deviation to understand the psychological health statuses of Chinese college bridge athletes. The specific results are shown in Table 2.

Table 2: Description of Mental Health Levels of Bridge Athletes (n=210)

Factor	Min	Max	M	SD
Somatization	1	3.00	1.28	.35
Obsessive-Compulsive	1	3.30	1.68	.55
Interpersonal Sensitivity	1	4.22	1.45	.50
Depression	1	3.38	1.44	.50
Anxiety	1	3.10	1.36	.41
Hostility	1	3.67	1.35	.48
Phobic Anxiety	1	3.00	1.25	.39
Paranoid Ideation	1	4.00	1.33	.44
Psychoticism	1	3.90	1.32	.45
Other Factors	1	3.57	1.45	.51
Total Score	90	277	125.76	34.90

In Table 2, the total score of the Bridge Athletes' Symptoms Self-Assessment Scale, with a minimum value of 90 and a maximum value of 277, has a mean value of 125.76 ± 34.91 . Except for Interpersonal Sensitivity and Paranoid Ideation, the maximum scores for all the other factors were lower than 4 points. According to the Chinese Normative Standard, when an individual's score on a factor is greater than 2, it exceeds the normal mean score and is considered positive. With a total score of more than 160, an individual is likely to have a mental health problem in this area.

Concerning the interpretation results of the SCL-90, a comparative description of the normal number of people who did not score more than 2 on any single factor and whose total score did not exceed 160, and the problematic number of people who scored greater than 2 on any factor and whose total score was greater than 160, is shown in Figure 2 below.

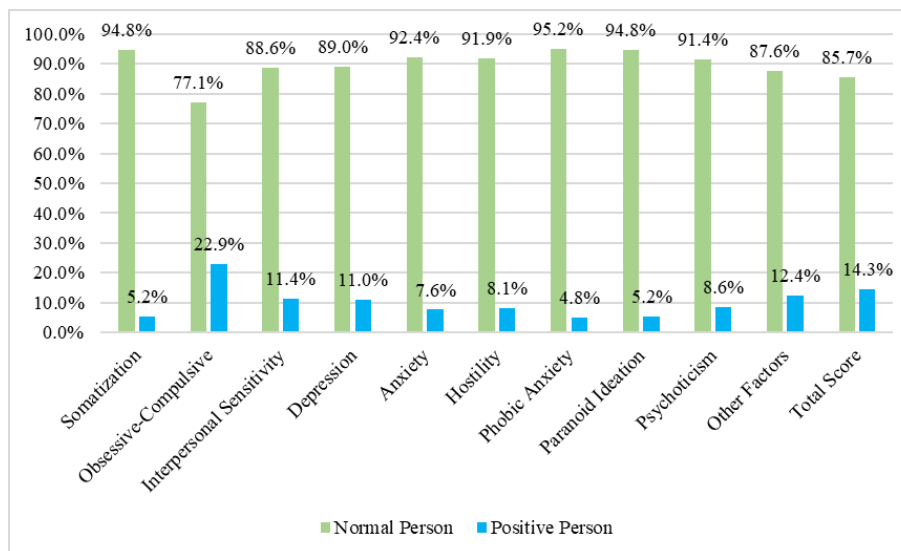


Figure 2: The proportion of bridge athletes in terms of scores for each factor and total score

According to the Chinese normative evaluation standard, a bridge athlete with any factor score of more than 2, or a total score of greater than or equal to 160, indicates the possibility of facing problems with mental health. In Figure 2, it can be seen that the proportion of bridge athletes with problems in each factor score is over 4.8%, and the proportion of those with a total score of 160 or more is 14.3%.

To clarify the situation of the number for positive factors, this study went further to count the distribution of each factor in the number of people in question, and the results are shown in Figure 3.

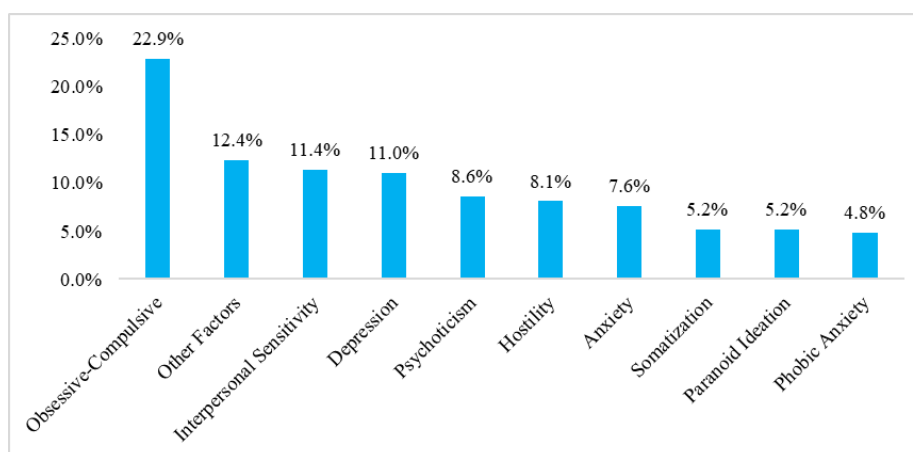


Figure 3: The ranking of the number of people at issue by factor

As shown in Figure 3, the number of questions is ranked on each factor, with Obsessive-Compulsive being the highest, followed by Other Factors, Interpersonal Sensitivity, and Depression. The percentages of problem-athlete numbers are, in descending order: 22.9%, 12.4%, 11.4%, and 11.0%.

On this basis, this study successively counted the number of people who had 1 or more positive symptoms at the same time. It was found that 2 people showed positive symptoms for all 10 factors, the number of people who were positive for 9 factors at the same time was 2, for 8 positive factors was 2, for 7 positive factors was 5, for 6 positive factors was 2, for 5 positive factors was 5, for 4 positive factors was 3, for 3 positive factors was 7, for 2 positive factors was 9, and for 1 positive factor was the highest number of people, which was 27. (See Figure 4)

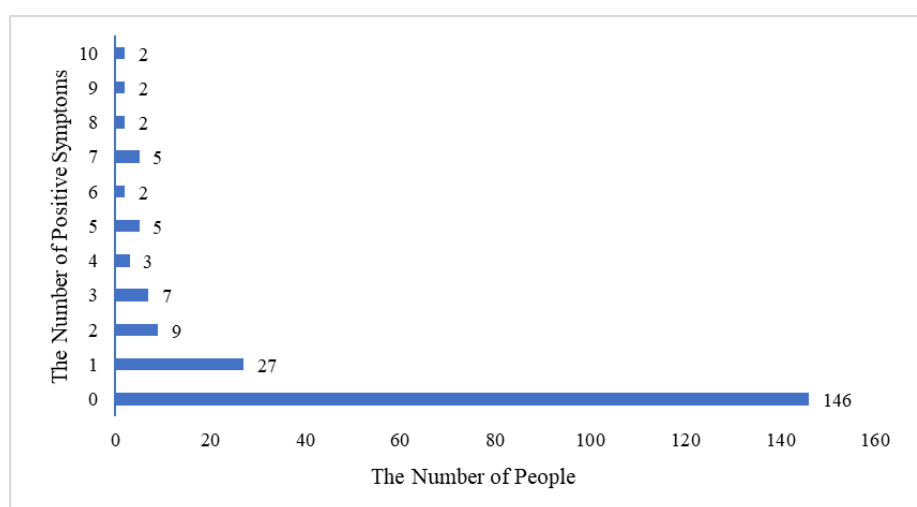


Figure 4: The number of symptoms of Positive Symptoms in bridge athletes

In summary, the descriptive statistics of SCL-90 scores of college student bridge athletes found that the number of people with scores above 160 was 30, accounting for 14.3% of the total number. The percentage of the number of positive symptoms was above 4.8% for each factor, especially in factors Obsessive-Compulsive, Other Factors, and Interpersonal Sensitivity. The number of physically disabled athletes with positive symptoms in at least one factor was 64, accounting for 30.1% of the total number. All the above results show that some bridge athletes have some degree of mental health problems, mainly Obsessive-Compulsive, Other Factors, and Interpersonal Sensitivity, which need to be paid attention by the majority of college bridge workers.

The Differences in Mental Health among Bridge Athletes with Different Gender

The mental health status of bridge athletes of different genders was analyzed by an independent t-test. The results showed that bridge athletes of different genders demonstrated significant differences in the three factors of Obsessive-Compulsive, Depression, and Phobic Anxiety, as shown in Table 3 shows.

Table 3: The Comparison of the Mental Health of Different Genders (n=210)

Factor	Male (n=122)		Female (n=88)		t	p
	M	SD	M	SD		
Somatization	1.27	.35	1.29	.35	-.422	.673
Obsessive-Compulsive	1.56	.48	1.85	.61	-3.688	.000**
Interpersonal Sensitivity	1.41	.49	1.50	.50	-1.361	.175
Depression	1.38	.46	1.53	.56	-2.030	.044*
Anxiety	1.33	.41	1.40	.42	-1.104	.271
Hostility	1.35	.50	1.35	.44	-.046	.963
Phobic Anxiety	1.21	.38	1.32	.40	-2.033	.043*
Paranoid Ideation	1.32	.45	1.35	.42	-.478	.633
Psychoticism	1.29	.44	1.37	.46	-1.265	.207
Other Factor	1.47	.52	1.43	.50	.585	.559
Total Score	122.41	34.35	130.41	35.33	-1.645	.101

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

In Table 3, both male and female bridge athletes scored the highest on the factor of Obsessive-Compulsive. Moreover, female bridge athletes scored 1.85 ± 0.61 , which is significantly higher than male bridge athletes ($p < 0.01$). In addition, female bridge athletes scored 1.53 ± 0.56 and 1.32 ± 0.40 on the Depression and Phobic Anxiety factors, respectively, which were higher than male athletes' scores on both factors ($p < 0.05$). Female bridge athletes demonstrated higher total score than male bridge athletes, however, it was not significant.

The Differences in Mental Health among Bridge Athletes with Different Ages

The age range of the bridge athletes investigated in this study were categorized into three groups: 18 to 21 years old, 22 to 24 years old, and 25 to 27 years old. One-way analysis of variance (ANOVA) was used to investigate the mental health of bridge athletes in different age groups. The results showed that the main age affected was significant only for bridge athletes only in the Obsessive-Compulsive factor. Analysis by the LSD method showed that bridge athletes aged 18 to 21 years significantly scored higher than 22 to 24 years in the Obsessive-Compulsive factor.

Table 4: The Comparison of the Mental Health with Different Ages (n=210)

Factor	18-21	22-24	25-27	F	p	LSD two-by-two comparison
	(n=128) (1)	(n=72) (2)	(n=10) (3)			
Somatization	1.30 ± .36	1.26 ± .34	1.10 ± .23	1.68	.190	
Obsessive-Compulsive	1.76 ± .57	1.58 ± .52	1.45 ± .46	3.50	.032*	(1) > (2) *
Interpersonal Sensitivity	1.48 ± .47	1.40 ± .55	1.31 ± .36	.98	.378	
Depression	1.48 ± .50	1.40 ± .54	1.22 ± .23	1.46	.236	
Anxiety	1.40 ± .42	1.31 ± .41	1.14 ± .17	2.74	.067	
Hostility	1.33 ± .42	1.38 ± .55	1.33 ± .51	.18	.836	
Phobic Anxiety	1.28 ± .40	1.21 ± .40	1.07 ± .23	1.44	.239	
Paranoid Ideation	1.36 ± .39	1.31 ± .53	1.18 ± .24	.89	.412	
Psychoticism	1.37 ± .44	1.27 ± .47	1.08 ± .10	2.84	.061	(1) > (3) *
Other Factor	1.48 ± .52	1.43 ± .50	1.27 ± .38	.86	.425	
Total Score	129.02 ± 34.47	122.26 ± 36.48	109.20 ± 21.74	2.07	.129	

*. Correlation is significant at the 0.05 level.

From the table 4, there are differences in the different dimensions of mental health among bridge athletes of different age groups, but there is an overall lack of significance. Except for the Obsessive-Compulsive factor, which was significantly different, and only two factors, Anxiety and Psychoticism were significantly close to the 0.05 level. The LSD two-by-two comparison revealed a p-value of 0.025 for (1) > (2) in the Obsessive-Compulsive factor, and a p-value of 0.048 for (1) > (3) in the Psychoticism factor, both reaching the level of significant. However, it is easy to see from the means value that the higher the age group, the lower the score and the higher the score level of mental health.

The Differences in Mental Health among Bridge Athletes with Different Levels of Education

In this study, the educational levels of bridge athletes were categorized into 3 groups: bachelor's degree, master's degree, and doctoral degree. One-way analysis of variance (ANOVA) was used to investigate the mental health status of bridge athletes with different levels of education. The main effect of educational attainment on the total mental health scores of bridge athletes approached the level of significance, with significant differences in scores on the Obsessive-Compulsive and Interpersonal Sensitivity factors.

Table 5: The Comparison of the Mental Health with Different Levels of Education (n=210)

Factor	Undergraduate	Master	Ph. D	F	p	LSD two-by-two comparison
	(n=175) (1)	(n=17) (2)	(n=18) (3)			
Somatization	1.29 ± .36	1.33 ± .35	1.14 ± .21	1.58	.209	
Obsessive-Compulsive	1.70 ± .57	1.84 ± .48	1.37 ± .36	3.69	.027*	(1)>(3) * (2)>(3) *
Interpersonal Sensitivity	1.45 ± .50	1.64 ± .60	1.20 ± .23	3.69	.027*	(1)>(3) * (2)>(3) *
Depression	1.45 ± .52	1.54 ± .52	1.21 ± .23	2.22	.111	
Anxiety	1.37 ± .43	1.42 ± .33	1.18 ± .27	2.01	.136	
Hostility	1.36 ± .48	1.48 ± .52	1.20 ± .29	1.50	.225	
Phobic Anxiety	1.27 ± .41	1.28 ± .38	1.08 ± .19	1.95	.146	
Paranoid Ideation	1.35 ± .46	1.33 ± .31	1.15 ± .29	1.79	.170	
Psychoticism	1.34 ± .47	1.33 ± .41	1.11 ± .24	2.18	.116	(1)>(3) *
Other Factor	1.46 ± .51	1.61 ± .60	1.29 ± .41	1.65	.194	
Total Score	126.86 ± 35.91	133.71 ± 31.54	107.61 ± 20.56	3.02	.051	(1)>(3) * (2)>(3) *

*. Correlation is significant at the 0.05 level.

The results of the analysis are shown in Table 5, in terms of total scores, bridge athletes with a master's degree had a higher total score of 133.71 ± 31.54 on the symptom self-assessment scale than bridge athletes with other degrees. Undergraduate bridge athletes scored 126.86 ± 35.91 , which was slightly lower than the scores of bridge athletes with a master's degree. Doctoral bridge athletes had the lowest score of 107.61 ± 20.56 , indicating excellent mental health. There was a significant difference between the total scores of undergraduate bridge athletes and doctoral bridge athletes. There was a significant difference in the scores in the Obsessive-Compulsive and Interpersonal Sensitivity factors, both of which showed that undergraduate bridge athletes' scores were greater than doctoral bridge athletes, and master's bridge athletes' scores were greater than doctoral bridge athletes. There was no significant difference demonstrated between the scores of undergraduate and master's bridge athletes.

The Differences in Mental Health among Bridge Athletes with Different Training Years

In this study, based on the data survey, the training years of bridge athletes were categorized into 3 groups: less than 2 years, 3 to 6 years, and more than 7 years. One-way analysis of variance (ANOVA) was used to investigate the psychological well-being of bridge athletes with three categories of different years in training. The results of the analysis in Table 6 indicate that the effect of years of training on bridge athletes is close to the level of significance. Significant differences were found in the scores of the factors Obsessive-Compulsive and Phobic Anxiety.

Table 6: The Comparison of the Mental Health with Different Training Years (n=210)

Factor	≤2 years	3-6 years	≥7 years	F	p	LSD two-by-two comparison
	(n=120) (1)	(n=69) (2)	(n=21) (3)			
Somatization	1.29 ± .33	1.30 ± .41	1.14 ± .22	1.79	.170	
Obsessive-Compulsive	1.79 ± .57	1.58 ± .51	1.42 ± .43	6.17	.003*	(1)>(2) * (1)>(3) *
Interpersonal Sensitivity	1.48 ± .46	1.45 ± .58	1.28 ± .37	1.47	.232	
Depression	1.48 ± .51	1.42 ± .55	1.28 ± .31	1.44	.239	
Anxiety	1.41 ± .42	1.32 ± .43	1.20 ± .28	2.58	.078	(1)>(3) *
Hostility	1.34 ± .44	1.40 ± .54	1.29 ± .47	.51	.602	
Phobic Anxiety	1.27 ± .39	1.28 ± .44	1.05 ± .13	3.05	.050*	(1)>(3) * (2)>(3) *
Paranoid Ideation	1.37 ± .42	1.31 ± .50	1.19 ± .29	1.60	.204	
Psychoticism	1.36 ± .44	1.31 ± .51	1.13 ± .20	2.26	.107	(1)>(3) *
Other Factor	1.48 ± .51	1.46 ± .54	1.29 ± .39	1.32	.269	
Total Score	129.02 ± 33.79	124.70 ± 38.82	110.67 ± 22.51	2.56	.080	(1)>(3) *

*. Correlation is significant at the 0.05 level.

A two-by-two LSD comparison revealed that in Obsessive-Compulsive, Anxiety, Phobic Anxiety, Psychoticism, and Total Score scores, bridge athletes with less than 2 years of training had significantly higher scores than athletes with more than 7 years of training. Meanwhile, in Obsessive-Compulsive factor scores, bridge athletes with less than 2 years of training scored significantly higher than athletes with 3 to 6 years of training. In Phobic Anxiety factor scores, bridge athletes with 3 to 6 years of training were significantly higher than athletes with more than 7 years of training.

The Differences in Mental Health among Bridge Athletes with Different Participation Experiences

Participating in competitions is one of the most important ways to improve an athlete's skill level and psychological quality. The more times they participate in competitions, the more stable the athlete's psychology is and the higher degree of mental health stability. Therefore, in this study, the number of previous participations of bridge athletes were counted and divided into 3 categories according to the statistical results: less than 2 times, 3 to 7 times, and more than 8 times. One-way ANOVA was used to study the mental health status of bridge athletes with different numbers of participations. The results of the analysis in Table 7 showed that the effect of the number of participations on bridge athletes was not significant.

Table 7: The Comparison of the Mental Health with Different Participation Experience (n=210)

Factor	≤2 times	3-7 times	≥8 times	F	p	LSD two-by-two comparison
	(n=81) (1)	(n=68) (2)	(n=61) (3)			
Somatization	1.28 ± .34	1.29 ± .39	1.25 ± .32	.20	.818	
Obsessive-Compulsive	1.74 ± .56	1.74 ± .59	1.54 ± .48	3.00	.052	(1)>(3) *
Interpersonal Sensitivity	1.49 ± .46	1.49 ± .59	1.34 ± .40	2.06	.131	
Depression	1.46 ± .52	1.48 ± .57	1.37 ± .40	.74	.478	
Anxiety	1.41 ± .45	1.38 ± .44	1.27 ± .32	2.25	.108	(1)>(3) *
Hostility	1.35 ± .45	1.38 ± .57	1.32 ± .39	.26	.774	
Phobic Anxiety	1.27 ± .37	1.29 ± .48	1.18 ± .31	1.53	.220	
Paranoid Ideation	1.35 ± .41	1.40 ± .54	1.24 ± .33	2.17	.117	
Psychoticism	1.38 ± .44	1.37 ± .55	1.20 ± .30	2.92	.056	(1)>(3) * (2)>(3) *
Other Factor	1.48 ± .51	1.45 ± .52	1.43 ± .51	.15	.859	
Total Score	128.47 ± 34.10	128.88 ± 40.44	118.69 ± 28.20	1.78	.171	

*. Correlation is significant at the 0.05 level.

Although the overall effect of the number of participations was not significant on mental health, the two-by-two LSD comparison revealed that bridge athletes with less than two participations had significantly higher scores than those with more than eight participations in the Obsessive-Compulsive, Anxiety, and Psychoticism factor scores. In addition, the Psychoticism factor scores also showed that bridge athletes with 3 to 7 participations had significantly higher scores than bridge athletes with more than 8 participations.

The Differences in Mental Health among Bridge Athletes with Different Skill Levels of CCBA

Skill level reflects some extent to an athlete's understanding of a particular sport. It is therefore necessary to explore whether skill level has an impact on the mental health of bridge athletes. The results of the survey found that most of the college bridge athletes did not obtain the level of skill rating from the Chinese Contract Bridge Association. Considering the reality that there are fewer high-level athletes, the skill ratings were divided into 3 categories, the first two being no rating and club master level. The Regional Master, National Master, and Lifetime Master are categorized as one in the third category. Table 8 shows that the scores of the factors of mental health of bridge athletes in the 3 categories are not significant.

Table 8: The Comparison of the Mental Health with Different Skill Level of CCBA (n=210)

Factor	None	Club Master	R&N&L	F	p
	(n=162)	(n=21)	(n=61)		
	(1)	(2)	(3)		
Somatization	1.27 ± .36	1.33 ± .31	1.27 ± .33	.30	.745
Obsessive-Compulsive	1.69 ± .57	1.73 ± .54	1.63 ± .48	.20	.822
Interpersonal Sensitivity	1.44 ± .52	1.52 ± .40	1.40 ± .43	.38	.686
Depression	1.45 ± .54	1.46 ± .36	1.38 ± .43	.20	.816
Anxiety	1.37 ± .44	1.30 ± .23	1.36 ± .38	.21	.809
Hostility	1.35 ± .50	1.37 ± .33	1.38 ± .46	.08	.925
Phobic Anxiety	1.27 ± .42	1.22 ± .26	1.17 ± .30	.87	.422
Paranoid Ideation	1.33 ± .46	1.38 ± .35	1.30 ± .36	.22	.804
Psychoticism	1.33 ± .48	1.25 ± .33	1.31 ± .36	.35	.708
Other Factor	1.45 ± .52	1.51 ± .49	1.46 ± .50	.14	.868
Total Score	126.03 ± 36.71	127.05 ± 24.52	123.15 ± 31.26	.10	.910

*. Correlation is significant at the 0.05 level.

R&N&L=Regional Master, National Master and Lifetime Master

DISCUSSION

The total score of the mental health symptom checklist of college bridge athletes was the lowest at 90 points and the highest at 277 points, with an average of 125.76 ± 34.91 points. Previous research data showed that the average score of Chinese mental health norm in 1986 was 129.96 ± 38.76 , and the sample size was 1388 (Jin et al., 1986). The average score of Chinese mental health norm in 2006 was 130.02 ± 33.62 , and the sample size was 1890 (Tong, 2010). These two norm scores are representative and widely used norm standards for Chinese mental health. By comparing the average value, in the results of this study, the average score of college bridge athletes' mental health is lower than the average score of the normal value. By comparing the mental health data of Wang et al. (1999) on the norm of middle school students' mental health and Zou (2022) on College Students' mental health, it is found that the average score of Chinese college bridge athletes' mental health in this study is at a low level. Through the above comparison, it shows that the mental health of Chinese college bridge athletes is decent.

The good mental health of Chinese college bridge athletes may be related to the characteristics of bridge training and learning. The bridge is known as "brain aerobics". Bridge learning is closely related to people's thinking activities (Chen, 2022). Zhang (2015) pointed out that the learning process of the bridge requires the use of information processing, strategic planning, and the knowledge of

psychology, as well as the exercise of stress resistance and psychological endurance, to improve people's self-restraint and willpower. In the process of continuous in-depth learning and training of bridge, the above characteristics are continuously strengthened, which makes bridge athletes have higher psychological adjustment ability and pressure resistance ability, and demonstrates the characteristics of a good mental health (Scott & Godbey, 1992; Wu, 2019). In addition, the bridge is a team cooperation project. Through systematic bridge learning and training, we can establish effective communication methods and establish team spirit. In the process of communicating with their partners and teammates, encouraging athletes to open their hearts, relieve pressure, and reduce bad emotions, which are also important reasons to improve the mental health level of College bridge athletes (Brkljacic et al., 2017; Pan et al., 2019; Punch & Snellgrove, 2020).

After comparing the average scores, let have a look at the proportion of high-score positive people and the single factor score. The proportion of people with a total score greater than or equal to 160 points accounted for 14.3% of the total, and the proportion of high-score positive people was not high, which was similar to the research of Cai et al. (2010). The proportion of college bridge athletes with single factor scores greater than or equal to 2 points is greater than 4.8%, which is different from Ren (2009). The single factor positive rate of college bridge athletes in this study is low. Although the average score of bridge athletes is good and the overall mental health is good, we still need to pay attention to the single factor score. The results of this study show that the top three single-factor scores are "compulsion", "other factors" and "interpersonal sensitivity", and the compulsion score is the highest. Additionally, 22.9% of the athletes scored more than 2 points in the factor of obsessive-compulsive symptoms, and the symptoms were positive. Obsessive-Compulsive disorder (OCD) is widespread in individuals. It is characterized by obsessive-compulsive symptoms, and recurrent and persistent behavioral symptoms. When the intensity and frequency of OCD are high, it will affect mood and behavior (Stein et al., 2016).

Other factors ranked second, representing the poor sleeping and eating conditions of Chinese college bridge athletes. More attention should be paid to their quality of sleep and eating habits. Improving sleep quality and diet may effectively improve athletes' mental health, which is similar to the research results of Liu et al. (2018). The score of the interpersonal sensitivity factor ranked third, indicating that there are communication barriers between college bridge athletes and their partners, teammates, coaches, etc., which is not conducive to the improvement of team cohesion. As a team cooperation project, the bridge urgently needs effective communication within the team. The tense interpersonal relationship is not conducive to the further development of bridge (Brkljacic et al., 2017; Li, 2004).

In addition, the analysis of variance on the factors affecting the mental health of bridge athletes found that female college bridge athletes were higher than male bridge athletes in three factors:

compulsion ($t = 3.69$, $P = 0.000$), depression ($t = 2.03$, $P = 0.044$) and phobic anxiety ($t = 2.03$, $P = 0.043$), which was similar to the study of Ren (2009) and Schaal et al. (2011). The mental health of bridge athletes in different age groups had significant differences only in the obsessive-compulsive factor ($F = 3.50$, $P = 0.032$). Compared with the high age group, the 18- to 21-year-old bridge athletes scored higher in all factors. In addition, this study found that the education level was closely related to the mental health of bridge athletes, mainly in two factors: compulsion ($F = 3.69$, $p = 0.027$) and interpersonal sensitivity ($F = 3.69$, $p = 0.027$). The scores of bridge athletes with doctoral degrees were significantly lower than those of bridge athletes with undergraduate and master degrees, which was similar to the research results of Jiang and Wang (2016). Low-educated athletes generally have a limited range of knowledge, and unable to find other gentle method to deal with the source of pressure effectively, thus, their mental health level is low (Lee et al., 2023).

Bridge training years, participation experience, and skill level are similar factors that affect the effect of bridge training. The results show that there are also significant differences in the mental health level of bridge athletes with different training years, which is manifested in the obsessive-compulsive factor ($F = 6.17$, $P = 0.003$) and the phobic factor ($F = 3.05$, $P = 0.050$). The overall score of bridge athletes with less than two years of training is higher, this is similar to the research results of Nagovitsyn et al. (2018). Since bridge athletes who have been trained for less than 2 years have not fully integrated into the training team, and are not familiar with the environment composed of bridge events, teammates, opponents, and coaches, they are more likely to have mental health problems (Rao & Wang, 2021; Wu, 2019). In the influencing factors of competition experience, there is only a difference in LSD pairwise comparison. The result shows that the more times the athletes participate in the competition, the higher their mental health level stability is which is similar with Wąsik et al. (2017). In terms of the influencing factors of bridge motor skills, the data of each group did not show significant differences, which may be due to the overall level of bridge among college students is not high, or the assessment method of bridge skills needs to be improved.

CONCLUSION

This study aimed to identify the mental health among Chinese college bridge athletes. It was found that the overall performance of bridge athletes' mental health level was at a good rate. The trend of the higher age, the longer training time, and the more participation, the better their mental health level is. In the gender difference of the athletes, the mean scores of male bridge athletes are lower than those of female bridge athletes and possess significant differences in the three factors of Obsessive-Compulsive, Depression, and Phobic Anxiety, reflecting the tendency characteristic of the mental health level of college bridge athletes that male students are better than female students. At the same time, combining

the differences in age, education level, years of training, and the number of competitions, it is concluded that the bridge study has a longer period of influence on mental health, which may have no significant change in 2 to 6 years, but beyond this period, the mental health level shows significant changes. With the gradual deepening of bridge learning and adherence to constant practice, coupled with the improvement of knowledge, the mental health of bridge athletes can be significantly improved, and the level of mental health will also be improved more substantially.

RECOMMENDATION

Since COVID-19 restricts the training and competition behaviors of Chinese college bridge athletes, and the number of participating colleges and athletes is small, it is suggested that when the number of athletes increases in the future, researchers can continue to focus on Chinese college bridge athletes as the main subject of the study, and pay more attention to their mental health. It is also possible to identify whether other mediating variables can improve the mental health level of college bridge students. As one of the three major intellectual sports and an official competition of the Asian Games, bridge has many benefits for students in terms of intellectual development, the cultivation of teamwork spirit, and the exercise of logical thinking. Therefore, it is suggested that colleges and universities should increase the popularity of bridge, so that more students can have the opportunity to contact the sport and enhance the strength of Chinese bridge reserve talents. According to the findings of this study, it is suggested that Chinese college bridge managers should not only improve the athletes' bridge skills and tactics, but also pay attention to the athletes' mental health, and ultimately promote a more comprehensive development of college bridge athletes.

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